A Comparison Between a Telemedicine and Traditional Model of Care with Nasal Continuous Positive Airway Pressure Use Among Patients with Obstructive Sleep Apnea Syndrome

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Introduction

- One third of our lives is spent sleeping
- Restful sleep is essential to a healthy life
- Obstructive Sleep Apnea Syndrome (OSAS) is a serious sleep disorder due to Excessive Daytime Sleepiness (EDS)

Public Health Impact

- Motor vehicle accidents (10%)
  - Drowsy Driving (62% adults) men > women
  - Falling asleep at wheel (33%)
  - Sleep apnea factor in 57% truck drivers crashes
- 10 million people are estimated to have undiagnosed OSAS

Telemedicine Management Models

- Use of *telecommunications technology* to remotely treat and monitor patients
- CHF—70% improved blood pressure, 90% reduced weight (Lanigan, et al., 2000)
- Asthma—positive attitude toward the use of a palm pilot in symptom report (Finkelstein, et al., 1998)

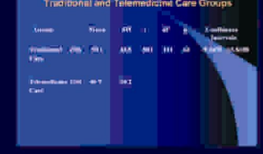
Research Design

- Randomized Control Trial
- Treatment Groups
  - Intervention (Telemedicine)
  - Control (Traditional Care)

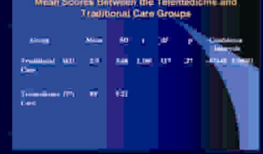
Data Analyses

- A chi square analysis was used to assess the differences between both groups
- Two sample independent *t*-test was used to compare treatment group means

Summary of T-test Analysis Examining the Mean Proportion of CPAP Use Between the Traditional and Telemedicine Care Groups



Summary of T-test Analysis Examining the Difference in General Perceived Self-Efficacy Mean Scores Between the Telemedicine and Traditional Care Groups



Summary

- General perceived self-efficacy (GSES) (general confidence to overcome obstacles and barriers) was no different in the Telemedicine care group compared to the Traditional Care Group.

Definitions

Obstructive Sleep Apnea (OSA)
- Cessation or partial obstruction of airflow
- Multiple brief arousals fragment sleep

Excessive Daytime Sleepiness (EDS)
- Most prominent presenting complaint
- EDS and OSA constitute the diagnosis of OSAS

Nasal Continuous Positive Airway Pressure (CPAP) Therapy

- Mainstay of therapy for OSAS
- Pressurization of upper airway by nasal mask
- Reduces or reverses apneas
- Reduces morbidity rate (Keenan et al., 1994)
- Side effects
  - Mask intolerability
  - Nasal congestion
  - Dry mouth

Without nightly use, relapse to pretreatment state (EDS) (Kribbs, et al., 1993)

Health Hero Network's (HHN) Health Buddy

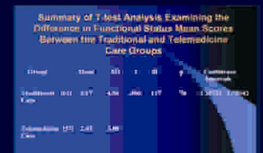
Outcome Variables
with observation intervals

- CPAP Use (average hours and proportion)
  - 30 days
- Functional Outcomes of Sleep
  - Enrollment and 30 days
- Client Satisfaction
  - 30 days
- Generalized Perceived Self-Efficacy
  - Enrollment and 30 days

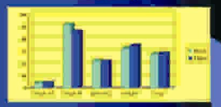
Results
Chi Square Analysis

	χ^2	p
Gender (men)	.76	.38
Body frame	6.32	.70
Ethnicity	7.55	.48
Marital status	9.65	.29
Educational level	9.43	.30
Employment status	.66	.53
Individual income	2.13	.71
Military status	2.76	.59
AHI/RDI severity	5.36	.25

Summary of T-test Analysis Examining the Difference in Functional Status Mean Scores Between the Traditional and Telemedicine Care Groups



Analysis of the inter-group comparisons across the measures under study



Implications for Practice

- Telemedicine is equally useful and beneficial in the therapeutic management of patients with OSAS who use CPAP therapy.
- Telemedicine is considered and recommended as a viable and suitable option of care in the clinical management of patients with OSAS who use CPAP therapy.

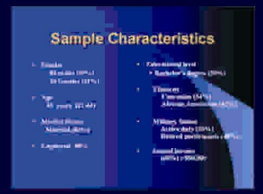
Risk Factors for OSAS

- Gender men > women
- Age (40 – 65 years)
- Obesity (most significant risk factor)
- Familial history
- Neck girth

Picture of CPAP Mask and Device

Patient Summary Report

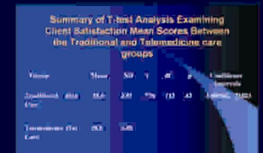
Sample Characteristics



Results

	Traditional	Telemedicine	P Value
Age	44 ± 8.5	46 ± 10	p = .49
CPAP pressure	9.0 ± 2.7	8.8 ± 2.3	p = .82
Epworth	14 ± 4.0	14 ± 4.3 p	p = .89

Summary of T-test Analysis Examining Client Satisfaction Mean Scores Between the Traditional and Telemedicine care groups



Summary

- Patients in the Telemedicine care group used CPAP as effectively when compared to participants in the Traditional care group (usual care)
- Patients in the Telemedicine care group had no significant improvement in functional status compared to participants in the Traditional Care Group (usual care)

Recommendations For Future Research

- Longterm study to evaluate the effectiveness of telemedicine
- Cost-effectiveness of telemedicine to compare money, resources and time to traditional care
- Telemedicine
  - Interactive
  - "Real time"
  - Tailored to the patient's needs
  - Web based

Epidemiology

INCIDENCE	PREVALENCE
• Unknown • Statistics easier difficult to ID disease free subjects • Night to night variability of symptoms • Measurement error	• Estimates range 4 - 5 % general population • 4% Men • 2% Women • 20 - 62% of age 40 – 65 y/o

Traditional Management of Nasal CPAP Therapy

- CPAP use > 4 hours on 70% of days (Hudgel et al., 1996)
- No universal definition or guidelines for CPAP compliance or regular use

Research Question

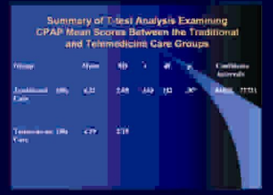
- How (wo groups of patients with OSAS randomized to either a telemedicine or a traditional management model of care compared in nasal CPAP use, functional status, self-efficacy and client satisfaction?

Sample Size

Traditional Care (N=67)
- 58- Completed Study
- 8- LTF
- 1- Withdrew

Telemedicine Care (N=66)
- 58-Completed Study
- 1- LTF
- 9- Withdrew

Summary of T-test Analysis Examining CPAP Mean Scores Between the Traditional and Telemedicine Care Groups



Results
Client Satisfaction

Health Buddy
- Satisfied Use-70%
- Satisfied Communication-70%
- Easy-82%
- No difficulty with use-83%
- Willing to continue-75%

Summary

- Patients in the Telemedicine Care Group were no more satisfied in clinic services compared to the Traditional Care Group
- More than three quarters of the participants in the Telemedicine group were satisfied with the Health Buddy compared